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ABSTRACT

Arguing that document design had its origins in the 1930s but that much of its development in theory, research, and practice has occurred in the 1980s, this paper provides a snapshot of the evolution of document design. The paper defines "document design" as the theory, research, and practice of creating comprehensible and persuasive texts. The paper includes a comprehensive list of 195 research references and stresses the need to integrate theory and research with practice in the 1990s. The paper concludes by identifying critical challenges to the international growth of document design, both in the academy and industry--challenges that must be met if document design is to flourish. Three figures are included. (RS)

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Center for the Study of Writing

Technical Report No. 39

DOCUMENT DESIGN FROM 1980 TO 1990: CHALLENGES THAT REMAIN

Karen A. Schriver

January, 1990

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Document Design from 1980 to 1990: Challenges that Remain

By

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Abstract

Document design had its origins in the 1930s, but much of its development in theory, research, and practice has occurred in the past ten years (1980—1990). This article provides a snapshot of the evolution of document design, includes a comprehensive list of research references, and stresses the need to integrate theory and research with practice as we move into the 1990s. The article concludes by identifying critical challenges to the international growth of document design, both in the academy and industry—challenges that must be met if document design is to flourish.

DOCUMENT DESIGN FROM 1980 TO 1990: CHALLENGES THAT REMAIN

by

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"Document design" is the theory, research and practice of creating comprehensible, usable and persuasive texts. Here, I mean "text" in its broadest sense, including both oral and written, and both visual or verbal. Professional document designers are rhetoricians whose education allows them to find creative solutions for the wide variety of ill-defined communication problems confronting business, industry, government, and education. Document design as a practice is not tied to particular text genres, particular audiences, particular subject matters, or particular text purposes. It is a highly constructive activity in which building an adequate representation of a communication problem demands careful analysis of the unique features of the given rhetorical situation. Thus, while knowing about particular text genres, audiences, subject matters, and purposes can be helpful, such knowledge is often a limited and even inhibiting starting point. In fact, if document designers invoke such knowledge too rigidly when they are building a representation of a communication problem, it can stifle their ability to find an original and creative solution.

In this article, I take a brief look at the activity of document design over the last decade. In particular, I am concerned with relating theory and research to practice in document design. To do so, I first discuss changes that we have seen in the theory of and research into document design, suggesting where we are heading as we move into the 1990s. Then I raise some issues about the practice of document design and focus on some of the skills and sensibilities document designers need to cultivate. Finally, I raise some concerns about the future of document design theory and research, isolating some of the persistent challenges that are constraining progress in this area.

THEORY AND RESEARCH THAT INFORM DOCUMENT DESIGN

Document design is an interdisciplinary area of inquiry with rich historical roots. It draws on a matrix of theory and research about how people produce and use text, particularly how they read, write, understand, and are motivated by text. At its heart, document design is concerned with readers and writers and how writers can most effectively find ways to provide readers with texts they can use, understand and perhaps even get excited about. Document design emphasizes both verbal features (rhetorical, linguistic, and discourse) and visual (graphic and typographic) dimensions of text. Thus, much of document design theory and research relates to cognitive, social, historical, and cultural issues which underlie the activity of creating and integrating visual and verbal text to meet the reader's various and frequently changing needs.

The knowledge that document designers need to draw on has been expanding rapidly in the past ten years. Figure 1 shows my characterization of the relevant theory and research influencing document design ten years ago as described by Felker and his associates at the American Institutes for Research, Siegel & Gale, Inc., and Carnegie Mellon University [1]. As shown, *early conceptions of document design highlighted the importance of composition, cognitive psychology, instructional design, readability, human factors, typography and graphic design, and psycholinguistics.*

Figure 2 presents my understanding of where we are now and the fields which are essential to current theory, research and practice. We can see that the boundaries of document design are expanding and this evolution is forcing us to think about our work in more complicated ways than

ever before. *We have enlarged our vision of the field by also drawing on rhetoric, social psychology, reading comprehension, human-computer interaction, computer technologies, discourse analysis, and cultural studies.*

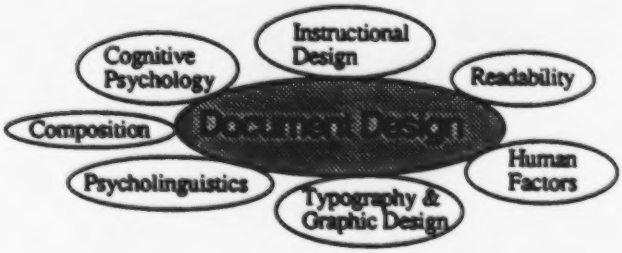

Figure 1. Relevant theory and research influencing document design ten years ago (derived from Felker, 1980; see reference 1).

In 1980, for example, the field of *rhetoric* was just beginning to reemerge in departments of English in the U.S. The wedding of rhetoric and composition is providing us with a very powerful historical and theoretical framework for considering how people construct meaning. It has also been a catalyst for building empirical theories about how people in particular rhetorical contexts read and write [2]. Adding rhetoric to document design heightened our awareness of audience and of diverse knowledge communities. Moreover, it has helped us to move beyond the simplistic notion that we always write for "generic" lay readers.

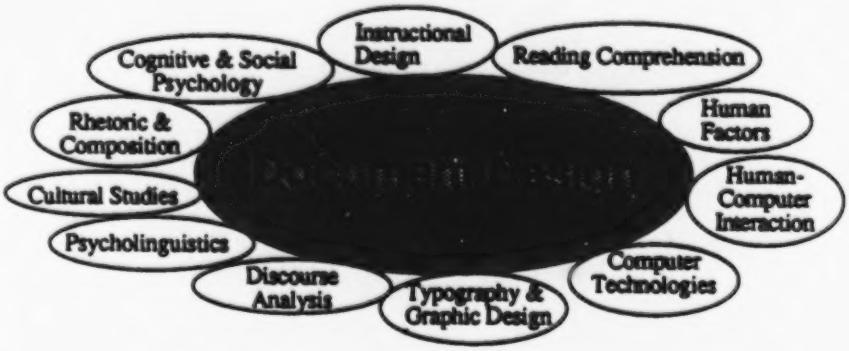

Figure 2. Relevant theory and research influencing document design today.

Cognitive psychology, with its emphasis on how individuals think and learn, has provided us with a detailed portrait of some of the key decisions people make as they read and write. Another promising direction for document design lies in exploring the literature in *social psychology* and relating those findings to our concerns. With the addition of social psychology, we can characterize readers' and writers' decisions more fully as taking place within groups and

organizations. Social psychology offers a large body of information about how people form impressions of others and about how they negotiate communication situations. Document designers are beginning to use such information in creating and evaluating oral and written discourse.

As Felker and his colleagues point out, early characterizations of document design focused on the *readability* of text as measured by readability formulas [1, 71]. That interest, while useful, gave us only a small window into the ways that texts can mislead and confuse readers. It also tended to make us concentrate on the word and sentence level of text to the exclusion of larger discourse structures. Early work in readability was severely limited by a model of reading that emphasized text features rather than readers [3]. Current theories of reading and *psycholinguistics* are strengthened by taking a much broader view of what goes on when people read; we now look carefully at the complex interactions between readers and texts. Thus, from now on investigations into issues of clarity and comprehensibility in document design must take into consideration recent work in both *reading comprehension* and *discourse analysis*. In addition, ongoing document design research must give emphasis to visual dimensions of text, relating how visual and verbal text structures work together in helping or hindering readers' abilities to build an integrated understanding of text.

Certainly the growth of *computing technologies* has been a major influence in altering our thinking about document design over the past ten years, particularly our understanding of *human factors* and *instructional design* issues. The explosion of the computer industry has not only made us aware of innovative ways to deliver, store, and transfer information, but it has opened up new ways to think about the structure of information itself. Emerging technologies have simultaneously created challenges for research in *human-computer interaction* and user interface design, spotlighting the importance of developing sophisticated theories of user-centered design. If one were to conduct a literature search on the influence of the computer on communications design since 1980, it would be an enormous undertaking. For example, a few years ago a group of researchers at Carnegie Mellon's Communications Design Center put together a review of the literature relating to the design of hardcopy and online documentation [4]. We excluded anything that did not have an empirical base. At that time (late 1985), we found over two hundred relevant articles, and by the time we went to print (Spring 1986), found hundreds more that had to be included in a supplemental bibliography. In looking at that review today, we think, "how dated!" Interdisciplinary research in this area will continue to influence our thinking about document design in the 1990s.

One of the most interesting additions to the field over the last few years is *cultural studies*, although so far, we have very little work that makes explicit connections between it and document design. It is clear, however, that cultural studies can contribute to document design in important ways. Understanding the historical, ideological, and cultural forces in organizations, societies, and cultures can help us better anticipate the assumptions, motivations, and reasons that people read and write as they do. As Odell has pointed out:

> . . .we have reason to suspect that a writer may be influenced not only by interaction with colleagues, but by something much less readily observable—by what Terrence E. Deal and Allen A. Kennedy [5] call the "culture" of the organization in which a writer works. That is, writers who are members of an organization (a corporation, a bureaucracy, a school, a club) may have internalized values, attitudes, knowledge, and ways of acting that are shared by other members of the organization. This culture, Deal and Kennedy assert, influences "practically everything" in the life of the organization [6, 250].

The last decade has prepared the way for advances in document design and it looks as though this theoretically exciting area of humanistic inquiry is gaining attention and momentum. Taken together, these new areas—rhetoric, social psychology, reading comprehension, human and computer interaction, computer technologies, discourse analysis, and cultural studies—along with

those we already embraced—composition, cognitive psychology, instructional design, human factors, typography, graphic design, and psycholinguistics—are forming a more contemporary conception of document design.

KEY CLUSTERS OF RESEARCH IN DOCUMENT DESIGN

Although document design is a vigorous field of study, it has an impoverished and scattered literature [4]. In fact, to date, there are very few reviews of theory and research in document design. This is so because document design is yet an emerging discipline which draws on the research of many fields of inquiry. It has been difficult to define the parameters of the field and even more difficult for reviewers to decide what issues to focus on. Furthermore, much of the research in the area has been conducted in Britain and is not widely available in the U.S. In addition, there are almost no journals devoted to document design and those that published much of the early work in the area have been undergoing difficult times to "stay afloat." (I am thinking of *Visible Language* and *Information Design Journal*). Thus, to review the research in document design in a way that captures its interdisciplinary nature as well as its historical evolution within an international research community is no minor task.

There are now a number of works which, taken together, have helped to define the parameters of document design [1, 4, 7-32]. The cumulative efforts of people who have conducted basic research, applied what was found from research, or cautioned against moving too quickly from research to application have helped to conceputalize document design.

Document designers build knowledge in two primary ways: we either conduct our own studies or examine the implications of existing research in related areas. Most of the work up to this point has clustered in five areas: research on (1) **writers**, (2) **readers**, (3) **text design**, (4) **text evaluation**, and (5) **communication technologies**. Researchers, of course, aim to draw inferences that help us to better understand how these areas interact. I will separate them simply for the purpose of discussion.

It is important to mention that much of the work that document designers use is not conducted under the name of document design. As I pointed out above, document design is an eclectic field and we borrow heavily from other fields to help us contextualize and refine our understanding of the issues that concern us. For this reason, in the characterizations that follow, I do not distinguish those researchers who view themselves as document designers from those who do not.

Cluster One: Research Focused on Writers

In exploring the writer as a creator of text, researchers in the past ten years have been focusing on both *writers' processes* and *writers' contexts*. On the one hand, researchers are studying the process of writing itself; while on the other, they are looking at how context influences what writers do.

Researchers who study the process of writing tend to examine writers' key decision points as they plan ideas, generate text, revise text, and evaluate its success [8, 14, 16, 26-27, 33-51]. This work which began by exploring cognitive processes involved in reading and writing has been elaborated with inquiry into social processes [6, 42, 52-53]. Much of the current research into writing processes concentrates on the types of knowledge that are important for developing expertise in writing: subject matter knowledge [43, 51, 54-56], social knowledge [57-58], linguistic and discourse knowledge [38, 46-47, 51, 54, 59-61], strategic knowledge [8, 40-41, 49, 62], rhetorical knowledge [8, 33, 49-51, 63-64], and perceptual knowledge [8, 34, 37, 40, 43-44, 49, 65]. (These are, of course, only some of the areas under investigation.)

Researchers are finding that early models of the writing process such as the 1980 Hayes and Flower model of composing [36] need refinement and are working on those modifications and elaborations [66]. During the 1970s, our attention was focused primarily on written *products* generally viewed out of context. In the 1980s, our attention turned to studying writing *processes* also generally viewed out of context. In the 1990s, our attention has expanded to include writing processes *and* products and we insist on viewing both in context. We are looking for ways to help writers transfer their knowledge of "writing processes" (e.g., recognizing that setting goals during planning is central to generating and evaluating ideas) to "creating effective texts" (e.g., actually generating text that is informed by one's goals during planning). To put it differently, we are striving to lessen separations between *thinking* and *doing*. We want to make theoretical and practical connections between process and product in the varied environments in which writing takes place.

Parallel discussions are occurring in our sister fields. Currently, in the educational research literature, for example, we find debate over the study of cognition in context. Researchers and educators are arguing over ways of studying and teaching ill-defined problem solving activities (such as writing) as they are situated in the social and physical world [67-68]. They are concerned with building bridges between knowing and doing, between thinking and acting. Work discussing a theory of "situated cognition" is raising new questions (as well as reminding us of some old questions) about relationships among domains such as reading, writing, and mathematics [69-70]. Document designers are taking advantage of this recent work and are becoming increasingly self conscious and reflective about what they do in carrying out a complex writing task.

Researchers investigating the writing context explore the organizational, political, social, cultural, physical, and technological contexts in which writers work and the ways in which context influences how document design tasks are represented and carried out. Most work thus far concerns writers as they compose while working within organizations [6, 22-23, 52, 71-74] or while participating as members of collaborative document design teams [75]. It also describes reading and composing while using computers [76-77] and evaluates how people interact with technology [78-79].

The goals of research focused on writers' processes and contexts include (1) building theories of writing, (2) modeling basic processes, and (3) developing methods for improving writers' abilities to create effective text (whether they are composing alone, within organizations, or as part of a team, using pen and paper or computers).

Cluster Two: Research Focused on Readers

Research into *readers' needs* investigates the goals, expectations, information requirements, preferences, performance abilities and learning strategies of readers with varying educational and experiential backgrounds, linguistic abilities, prior knowledge, and reading skills [80-95]. Work in this area is helping writers build a more accurate representation of particular readers as they are engaged in understanding and using text.

In the past ten years, we have seen a number of reviews of work in audience written by people in rhetoric and composition; see, for example, Ede and Lunsford's review [96]. We have also observed a proliferation of empirical work on readers' needs coming from reading comprehension theorists, educational psychologists, instructional designers, and psycholinguists. This work is providing us with essential information about the processes involved in reading as well as about the strategies people employ during comprehension. One of the more interesting findings is that readers' ability to construct meaning from text is partly related to their ability to think about their own understanding as they read. More specifically, research has underscored the centrality of metacognitive knowledge in reading—that is, knowledge of strategies for planning ahead, for checking one's understanding, and for revising one's strategies for comprehending during reading.

Many studies have shown that children, young adults, and less able readers are not aware that they need to "be strategic, plan ahead, and check their own understanding" [85, 502]. For such reasons, writers need to find ways to design text that anticipates a quick, probably passive reading. Document designers are well aware that such reading strategies are typical, especially with instructional, functional, and science texts. As document designers, we often write for readers who are in a hurry, frustrated, bored, and who would prefer to get information needed from text in any other way but reading.

A related strand of research focuses on exploring the needs of computer users. Part of this work aims to define and classify user groups [97-102]. Along with work that aims to distinguish different kinds of users is research that is observing what users have in common. Efforts in this area have focused on how users learn to use technology, the problems they have with navigating through online search spaces (such as hypertext), and the mental models they bring to interacting with machines [103-106]. The goals are to move from empirical findings about users' needs to specifying ways to design text (either online or hardcopy) that meets those needs and to build effective user interfaces and computing systems.

In *Research in Written Composition*, Hillocks points out that it is surprising we have not seen more empirical work in this area coming from rhetoric and composition researchers, given the high profile of "audience analysis" in the literature [107, 84]. Research into readers' needs seems likely to flourish in the 1990s, especially research on cultural differences, because of the creation of the open market in the European community in 1992. And with international trade increasing, we can expect to see more research into cross cultural negotiations [108].

The importance of this cluster of research cannot be overemphasized. Recent discussions of audience argue convincingly that much of the folk wisdom about readers is too general to be useful. We are also learning that guidelines about audience are often difficult to translate into action [50, 109]. Writers and speakers need more detailed knowledge about what readers or listeners are "actually doing with their texts." In this way, they can move from "audience analysis" to making explicit text plans and revisions.

Cluster Three: Research Focused on Text Design

Research on *text design* concerns the effects of various text designs, both visual and verbal, on readers' comprehension, performance and textual preferences. This work has been directed to the question, "How can we design text that both appeals to an intended readership and enhances their ability to understand, learn, use and retrieve information?" Researchers have been trying to determine why some texts appear to promote seemingly effortless comprehension while others make readers struggle to understand.

Through evaluating how texts operate, researchers in this area are providing us with information about cognitive aspects of readability [110-113]. We are also gaining insights into readers' responses to (a) topic sentences [114]; (b) topical structure [38]; (c) paragraph structures [115]; (d) coherence in text [116-118]; (e) performance-oriented headings [119-120]; (f) structural signals [89, 121]; (g) examples and elaborations [122-123]; (h) metaphors and analogies [124-131]; (i) typography [24, 132-134]; (j) graphics, illustrations, and pictures [10, 15, 17-18, 21, 28, 29, 135-137]; and (k) charts, diagrams, and tables [29, 138-140]. By looking at readers' responses to such visual and verbal text features, researchers draw inferences about the text structures that promote or inhibit readers' comprehension and use of text.

Recent studies are beginning to uncover the amount of content and the level of detail to provide for optimal understanding of text, particularly instructional texts such as tutorials for computer users [141-144]. Such work is also giving us a better sense of the various text structures that enhance readers' abilities to draw "accurate" inferences from instructional text [145]. These and other studies are helping us to make more informed decisions about integrating visual and verbal text.

Cluster Four: Research Focused on Text Evaluation

Research in *text evaluation* develops, refines, and tests alternative methodologies for assessing the effectiveness of text. Text-evaluation studies have a long history. In the 1930s, work mainly focused on generating formulas to assess the relative readability of text [3]. Today, most work in the area is directed to research into persuasiveness, comprehensibility, memorability, and usability. Recent studies draw heavily on the literature in rhetoric, reading comprehension, psycholinguistics, discourse analysis, text design, human factors, and instructional design.

Such work raises the questions: In what ways do particular methods for evaluating text quality help us to discriminate good from bad text? What are the advantages and disadvantages of particular evaluation methods? What methods give evaluators insight into problems at the global level of the text, e.g., problems caused by the text's organization? What kinds of feedback helps writers most when involved in revising to meet readers' needs? What are the best converging methods for evaluating text? What do writers learn from testing? How can we build computer programs that will help reduce the burden of text evaluation [4, 27, 50, 110, 146-161]?

Text-evaluation research is playing an enormous role in education, the military, and industry. Work in education, for example, is investigating methods for assessing the effectiveness of the textbooks used by millions of schoolchildren and adults [82]. Similarly, the explosion of usability testing in industry is fostering the development of ways to incorporate text evaluation into all phases of the document-development cycle, and sophisticated formative and summative evaluation procedures are now becoming commonplace. Writers are finding that reader-focused testing methods [156] help them *beyond* revising the text under evaluation; they also give writers information that is useful in planning future texts. In particular, we are learning that reader-focused testing methods such as protocol-aided revision have immediate and long-term benefits for helping writers to anticipate readers' problems with poorly written text [50, 156-157].

Another strand of text-evaluation research focuses on characterizing the cognitive processes of writers as they are engaged in the activity of evaluating a text from the perspective of the intended reader. Researchers want to know what evaluators look for when judging text quality. This work is telling us that experienced text evaluators pay close attention to text problems caused by what is written and by what is left out. Put differently, evaluators need to be sensitive to *problems of commission* such as faulty syntax and *problems of omission* such as missing examples and elaborations [50]. Problems of omission are, of course, the most difficult to anticipate.

Investigations into text evaluation are changing the way we define text quality and are broadening our understanding of the nature of revision. Because text-evaluation research is centrally concerned with discovering ways to decide whether what we write works, it is perhaps the most critical research area.

Cluster Five: Research Focused on Communication Technologies

Research focused on *communication technologies* examines both the impact of the information medium and the effect of information structures on readers. This work has a wide range of general directions (for instance—online information, online help, natural-language interfaces, hypertext, video disk, CD-ROM and so on) as well as a myriad of subspecialties (such as message, menu, and icon design). Major research thrusts include (1) how people use media, (2) how particular features of media influence human-machine interaction, and (3) how peoples' expectations and prior knowledge influence their reception of media. Most work in the area has specialized in creating online text and novel approaches to organizing and delivering information [162-166]. Recently, considerable energy is being devoted to designing approaches to non-linear text structures [167-172].

Researchers interested in communication technologies are often intrigued by the intersection of issues and may, for example, begin by studying general questions about how people use online help. The results of such an inquiry might lead them to ask a more focused question, such as how pull down menus influence users' abilities to access help. And the results of that sort of study might suggest ways to study how menu-driven interfaces influences users' expectations in using hypertext systems; see Duffy, Palmer, and Mehlenbacher's work, for example [163].

Work in this area has been accelerating. Document designers can take advantage of the efforts of an enormous number of researchers in human-computer interaction, interface design, and computer science. It is important that document designers who want to work in this area, however, draw on and consider the literature in the other four research clusters discussed above before they undertake new missions. Research into communication technologies must be grounded in research on people. Humanists have an important role to play in the progress of this area in the 1990s.

SOME MISUNDERSTANDINGS RELATED TO DOCUMENT DESIGN PRACTICE

Document design is not, as some have trivialized it, the process of formatting text to make it visually appealing; nor is it desktop publishing. Although page design is an important skill if one is working with text on paper or on a screen, a good page designer or desktop publisher is not a document designer. These misunderstandings have an obvious origin: the name "document design" itself.

The word "document" in "document design" is the first problem; it connotes a restricted meaning (that is, paper documents) that does not adequately represent the nature of the field nor the scope of its activities. For such reasons, most document design firms and research organizations now characterize what they do as "information design" or as "communications design." Thus, the rationale behind the name of Carnegie Mellon's document design research organization, The Communications Design Center.

A second problem is with the word "design" in document design. Ask most people what they think of when they hear the word "design" and they will mention graphic design, industrial design, fashion design and so on. Typically, however, most people are not familiar with hearing "document" and "design" used together, and are often less stereotypical in their "off the cuff" definition of it than they are in their definition of the phrase "technical communication." Thus, the relative ambiguity in the name document design can, I think, be seen to have a positive side. In his introduction, Felker rationalizes the choice of "document design":

> Everyday, millions of people read public documents prepared by government agencies, commercial and financial organizations. These public documents include regulations for every conceivable kind of product and process, labels for over-the-counter and prescription drugs, rental agreements and insurance policies, and income tax instructions and forms. . .We use the term "document design" to describe the overall movement at [*sic*] producing effective public documents—documents that are comprehensible to their intended users. . .The words "document design" are a deliberate choice because they convey the complexity of the field. The terms "clear writing" and "plain English" are not sufficient because useful, understandable documents entail more than easy words and simple sentences. The organization and format of a document may be just as important as its language. The degree to which the document is matched to the capabilities of its users and the setting of its use may affect comprehension as much as clearly written sentences. The broader term "document design" encompasses these added complexities [1, 1-2].

DOCUMENT DESIGN PRACTICE: KEY SKILLS AND SENSIBILITIES

Felker's discussion raises a host of questions that practitioners in the area face every day: What is a clear document? How do we know when a document is comprehensible for a particular audience? What can a document designer do to make a document more understandable? An important part of answering these questions lies in practitioners' abilities to recognize the kind of reading that "gets done" in the academy and in the workplace as well as to anticipate "what readers are doing" with text. Frase, Macdonald, and Keenan describe the evolution of reading in the world of work:

> As society has become more complex, so has reading. . .Reading at work is especially affected. In the 1970s a professional had to read 30 documents a day to keep up with the field [173]. Today that figure has more than doubled, and technological change has compounded the problem. The Naval Air Systems Command, for instance, supplies technical manuals for 135 aircraft. There are over 25,000 manuals, totaling 3 million pages. In 1950 the manuals for one aircraft contained fewer than 2000 pages; today the manuals for one aircraft contain nearly 300,000 pages [174]. . .Not only has the information changed, but its form as well. Computers have altered the form of information from the familiar page to small packets of information displayed on a screen. These bits and pieces of information, propelled by satellite, stream around the globe, ignoring geographic and national boundaries. Indeed, literacy has entered a new age [150, 97-98].

In addition to changes in the amount of reading that gets done, practitioners in document design must anticipate a wide range of goals for engaging with text, including reading to—

- Learn (studying a textbook)
- Enjoy (solving a mystery story in an online interactive fiction program)
- Do a task (filling out a tax form)
- Write (synthesizing arguments in order to construct an original statement on a topic)
- Understand (reading to comprehend one's rights in a legal contract with a landlord)
- Be persuaded (reading an advertisement about exercising equipment)
- Find information quickly (reading a telephone directory to locate an emergency phone number for the police)
- Compare and contrast (reading the editorials in a newspaper)
- Learn to do (reading a tutorial to learn about a procedure that needs to be performed without the text)
- Make a decision (reading a pamphlet that describes the implications of voting for or against nuclear power)
- Assess the relevance or interestingness of a text (skimming the abstract of a journal article to decide if the content may be useful or interesting)

- Interpret and use the information for a purpose other than the text's intended purpose (reading a computer manual to solve a problem that is not described in the text, but that may be solved by looking at examples of related problems)

The diversity of readers' needs and goals across contexts means that we cannot define "a well-designed text" without reference to those needs, goals, and contexts. A good text for a novice is not necessarily a good text for an expert. Novice computer users, for example, have been found to prefer "asking another person for computing information" or using "hardcopy tutorials" while experts prefer "figuring it out for themselves" or "online documentation" [102]. The situation is complicated by the fact that an individual may be expert in one part of a domain and novice in another. Document designers in industry, government, and education are finding that it is becoming increasingly important to distinguish the writing they do for novices, intermediates, and experts.

Unfortunately, up to this point, we have very little research on what audiences with different levels of subject matter knowledge (or domain expertise) need or want. We also have scant research on the knowledge writers need to be effective in selecting the most appropriate content, at the most appropriate level of detail, in the most appropriate form and media for a particular audience. We have almost no empirical work *from the perspective of a document designer* on the questions, What is the relationship between writing knowledge and subject matter knowledge? How does subject matter knowledge help writers? How does it hurt writers? Is it better to have an expert writer who is a subject matter novice or a novice writer who is a subject matter expert?

Obviously some combination of writing knowledge and subject matter knowledge is important (and most of us who teach document design tend to emphasize "writing knowledge") but we have no empirical support for our instructional practices. (My colleagues and I are undertaking some work in this area [56] but have been unable to locate studies that look at the relationship between writing knowledge and subject matter knowledge in context, much less across diverse contexts such as those found in industry, government, and education.) Because writers need to think about readers in more precise ways, we must develop and test new instructional methods to help writers recognize readers' needs [50].

We now know that when writers choose a career in document design, they must be prepared to write just about any text genre for any sort of audience. Document designers working in the consumer electronics industry, for example, must feel equally comfortable with writing the operations guides for installing a state-of-the-art home theater system (that is, a fully integrated audio/video system with a wide screen television and Dolby surround sound, CD player, audio/video stereo receiver, dual tape deck, VCRs, giant loudspeakers, and so on) as they are in creating the advertising copy for television and radio ads that feature users getting "blown away" by sound and image. The same document designers may also have to feel equally comfortable ghost writing the speech for the company's chief executive officer who has to deliver "the bottomline facts" to the shareholders or writing the script for the company's sales representatives who are "hyping" the system at the international consumer electronics show.

These diverse document design tasks call on a repertory of rhetorical talents. For instance, in writing an operations guide or a fact-oriented speech, the writer must restrict meaning; in writing an ad or creating a sales pitch, the writer aims to evoke interest. The ability to move easily between creating a text that demands precise use of restricted meanings and one which offers readers the invitation to embellish, to reconstruct, to free associate, to "make the text anew" is now a requisite document design skill.

Thus, the old industry stereotype that "anybody who can speak can write" is proving to be grossly inadequate. When "anybody" is asked to write such diverse texts, they almost always fail. Government and industry are tired of "losing face" or profits because of poor communication [175]. Headlines such as "*Hundreds of Coleco's Adams are Returned as Defective: Firm Blames User Manuals*" still haunt us [176].

As we head into the 1990s, companies around the world have or are planning to create departments dedicated to document design. Further, many colleges and universities are developing degree programs in document design. The growth of theory and research in the area is making government and industry think seriously about providing in-house training programs in document design as well as supporting continuing education at the university level. Many writers and managers of publications departments are now expected to obtain a masters or doctoral degree in rhetoric, document design, professional or technical communication. Indeed, document design is rapidly becoming an area of subject matter expertise equal in sophistication to any other profession.

CHALLENGES THAT REMAIN

There are two persistent problems that have constrained research in the area. The first has been the status of document design within the academy. And the second has been the lack of availability of funding for researchers interested in either basic or applied work in the document design.

The First Problem: The Status of Document Design within the Academy

Traditionally, investigations into nonacademic discourse (under the rubrics of professional writing, technical communication, or document design) have not been popular nor have they been rewarded in English departments in the U.S. Viewed as the ugly stepsister of academic discourse, nonacademic writing has always had the lowest political status in an English department—even lower than that of freshman composition (the traditional intellectual ghetto)—and many people who teach nonacademic writing and direct its programs are untenured instructors or part-time adjunct faculty. Tenure-track faculty members in many U.S. English departments have been actively discouraged from publishing in the area because it has been construed as atheoretical, anti-humanistic, smacking too much of the material world, and uninteresting in comparison to the teaching of poetry, fiction, or academic discourse.

Because document design embraces nonacademic discourse, the academy has tended to construe document design's object of study as only nonacademic discourse. This has been the view, even though document design has *never* excluded academic discourse. This misunderstanding combined with pejorative attitudes about "tech writing" led many academics to dismiss the area as lacking intellectual integrity. Richard E. Young summarizes the "tech writing" stereotype in this way:

> Over the years "tech writing" has been for the most part characterized by a sharp split between form and meaning, along with equally sharp distinctions between convention and originality, objective and subjective knowledge, personal and impersonal style. The technical writer is to be concerned only with issues of linguistic form and convention, accuracy of statement about objective reality, and an impersonal style. . .The teaching and practice of technical writing has been by and large an ahistorical, atheoretical enterprise with only the weakest of ties to rhetorical studies [177, 11].

Luckily, this view is changing. In the last decade, many English departments in the U.S. have been radically redefining what is important in studying reading and writing. Three major changes in English departments are playing a major role in how document design is viewed: the rising status of rhetoric and composition, the reconceptualizing of document design as part of the study of rhetoric, and the evolving definition of the study of literature.

The rising status of rhetoric and composition. Ten years ago, almost no English department in the U.S. would think of hiring a tenure-line faculty member with a primary interest in research in rhetoric and composition. The few rhetoricians who were hired before 1980—people such as Edward P. J. Corbett, Wayne Booth, W. Ross Winterowd, Richard Ohmann, Janice Lauer, Richard L. Larson, James Kinneavy, S. Michael Halloran, and Richard E. Young—tended to be among the

most visible scholars in rhetorical theory and history. (For a list of the most active rhetoricians in the U.S. during the mid 1970s, see the *Newsletter of the Rhetoric Society of America* [178].) The idea of hiring someone who wanted to study the process of composing in academic or nonacademic contexts was unheard of. Indeed, composition teachers were grossly exploited; when research in writing got done, it was not because English departments supported it, but despite their lack of support.

Most of the intellectual debates of the time were not over research questions but rather over whether rhetorical studies even belonged in an English department. Many of the articles were rationales for or against the independence of rhetoric programs from traditional English departments. See, for example, Richard Coe's 1974 "Rationale for the Independence of Rhetoric Programs" [179] and Richard L. Johannesen's subsequent response [180]. Johannesen points out that the discipline of rhetoric was already firmly established in departments of speech and communication ten to twenty years before it became an "issue" in English. Nonetheless, during the 1970s there was considerable disagreement over the role of rhetoric in English (and, in fact, debates still persist and are certain to continue beyond the next decade as well). Although there have been enormous political difficulties (as well as personal costs to individual rhetoricians) in creating rhetoric programs within English, we have seen a dramatic rise in the status of rhetoric and composition over the last decade.

Today, the more progressive departments have not only tenured literature faculty but tenured rhetoric, composition, document design and technical communications faculty as well. The rise in status of rhetoric and composition is reflected in structural changes in the undergraduate and graduate curricula English departments offer. As Donald C. Stewart points out in his 1989 article, "What is an English Major, and What Should It Be?":

> . . .the most remarkable undergraduate English program[s]. . . .offer students the opportunity to concentrate on literary and cultural studies, creative writing, professional writing, or technical writing. . . .The student in such a program would have a remarkably broad perception of the theoretical and practical issues in many facets of the discipline we call English [181, 199].

In fact, rhetoric programs with their own graduate faculty are flourishing and research in writing is gaining international recognition in the academy. David Chapman and Gary Tate identify 53 schools with doctoral programs in rhetoric and composition [182]. Of course, faculty members from rhetoric have always supported research in both academic and nonacademic writing. Thus, with the rise in status of rhetoric and composition, document design has been nurtured.

The reconceptualizing of document design as part of the study of rhetoric. Today, document design is viewed as a key area of rhetorical studies; but this has not always been an operating assumption--even among document designers. As Figure 1 (presented earlier) shows, early characterizations of document design such as Felker's review of the literature did not include rhetoric [1]. In fact, very little work in composition was included. If readers look carefully, they will find a short discussion of the early Hayes and Flower work on composing in a chapter about cognitive psychology under the heading "use of procedural information" [1, 36-39]. We find that early conceptions of the field failed to emphasize the rhetorical nature of document design.

Fortunately, rhetoricians such as Carolyn R. Miller have helped us to recognize and embrace the connections between rhetoric and document design [183-184]. Richard E. Young points out that—

> . . .a recent reconceptualization of technical writing as *essentially rhetorical* [italics added] is producing some startling changes. This reorientation in thinking about technical discourse is exemplified in Merrill D. Whitburn's "The Ideal Orator and Literary Critic as Technical Communicators: An Emerging Revolution in English Departments" [185]; Carolyn Miller's "A Humanistic Rationale for Technical Writing"

> [183]; and Walter B. Weimer's "Beyond Philosophical Reconstruction" [186] and "Science as a Rhetorical Transaction: Toward a Nonjustificational Conception of Rhetoric" [187]. . . .Carolyn Miller remarks that "without a theory of technical and scientific discourse as argument, asking about invention in such discourse is an irrelevant--or foolish--undertaking. But with the beginning attempts to examine technical and scientific discourse as rhetoric, work that had seemed fragmented and unrelated acquire a new orientation, as though magnetized" [184, 152] [177, 11-12].

Reconceptualizing document design under the aegis of rhetoric connected us a history of rhetorical studies extending from ancient Greece and Rome to the present [2]. In addition, the matrix of other disciplines that are important to document design—each with its own history—gives us a much broader epistemological base on which to conduct new work (see Figure 2, shown earlier).

The evolving definition of the study of literature. In the past ten years, there has been a major change in literary studies, specifically from programs in literary studies to programs in literary and cultural studies [188, 34]. Recent developments in literary theory are challenging antiquated notions of the province of English departments. Literary theorists are seriously questioning the academy's traditional focus on belletristic texts and are championing the expansion of literary studies to include texts outside of the academy, including non-valorized genres and formats. In *Professing Literature,* Gerald Graff lists more than a dozen departments that have reconfigured their priorities within the last decade [189, 258]. If current hiring trends are any indication of the future, it seems likely that as more literary and cultural theorists are hired in the 1990s, we will see a more rapid evolution in the definition of the study of literature, and such changes may indirectly benefit the study of document design.

Taken together, these three changes in U.S. English departments—the rising status of rhetoric and composition, the reconceptualizing of document design as part of the study of rhetoric, and the evolving definition of the study of literature—represent the lifting of significant institutional and intellectual constraints on the study of document design within the U.S. academy.

Unfortunately, because of parallel misconceptions about the intellectual integrity of studying writing, document design is rarely taught in the academy outside of the U.S. However, there are beginning to be very hopeful signs in Britain [190], West Germany [191], and Canada [192]. Classes in writing and document design are starting to emerge in universities and colleges and a few institutions are mounting degree programs. There is also a great deal of interest in developing educational programs at the university and college level in Japan [193], Australia [194], and Africa [195].

As the academy's skeptical attitudes toward studying document design change, progress will be made, particularly in developing theory and research and relating such work to practice. Moreover, it also looks as though the academy's longstanding dichotomy between basic and applied research is beginning to abate.

The Second Problem: Lack of Funding from Government and Industry for Research

Since the original U.S. government-sponsored Document Design Project (1978-1981) there have been no major funds for document design research coming from the U.S. government. And there have been very few grants available to researchers in other countries.

Like government, industry has been slow in funding nonproprietary basic and applied research in document design. Many multinational corporations look at document design as a necessary but low-profile activity to help make their products more attractive and usable. When companies do fund document design work, it is typically "to put out fires," that is, to fix a particular document that isn't functioning well. It is unfortunate that government and industry often fail to see that funding basic and applied research could help them to solve reoccurring communication problems.

- What are the relationships among cognitive, social, and cultural factors in document design?
- Are there differences between writers and readers across cultures? Do the same writing strategies, for example, work for Japanese and English speaking audiences? Do readers in various cultures read and access information in similar ways?
- What is the relation between oral and written communication in social contexts? For example, how does oral and written language work together in educational, government or corporate contexts? Are there culture-specific patterns?
- What is the role of writers' knowledge in document design? Subject-matter knowledge? Linguistic knowledge? Perceptual knowledge? Strategic knowledge? Rhetorical knowledge?
- What constitutes skill in document design? What do document designers need to know to become expert? What experiences do they need?
- What is the best means for soliciting subject matter knowledge from experts? How should writers without subject-matter expertise proceed?
- How can research on reading best be applied to document design?
- What are the principles underlying the visual design of effective text? Do some visual information structures meet readers' needs better than others?
- What are the best strategies for designing texts that serve multiple functions, for example, to inform and persuade?
- How does collaboration with other experts shape the nature of the document design process? What are optimal collaboration points among people (e.g., writers, designers, and subject-matter experts) contributing to the same text?
- How can technology facilitate the document design process? What constraints does technology place on the document design process? What are the key features of a user interface that would best support collaborative document design?
- How do the needs of expert audiences differ from those of lay audiences? How can the needs of multiple audiences best be addressed?
- Which text-evaluation methods are best suited for judging text quality? At what point(s) in the document design process are particular text-evaluation methods most useful, e.g., what tests should be used for first drafts? Can we develop more sensitive text-evaluation methods than are currently available? Are there effective combinations of existing methods?
- What do writers learn from testing documents and observing readers interacting with text? Are there long-term benefits? Can we consolidate this learning and teach it more directly?
- What are the most likely candidate text features for building online text critiquers? Can the computer help us in text evaluation more than it has?

Figure 3. An agenda of research questions for document design in the 1990s.

Because government and industry tend to fund "revisions of X" or "guidelines for Y," document designers have generated a lot of excellent solutions to local communication problems. *But we are failing to get a handle on the global problems: problems that transcend company and product lines, that transcend our international borders.* It is only through addressing the global issues that document design will become a powerful and respected discipline.

A RESEARCH AGENDA FOR DOCUMENT DESIGN IN THE 1990s

Given the current situation, it is not surprising that some people from the academy and from government and industry say that document design does not really have a research agenda and that our concerns are hopelessly fragmented. As we head into the next decade, it seems imperative that we act to mitigate such perceptions by working on a research agenda that grows *both* out of what we know and what we do not. Our research agenda should enrich our understanding of the complex relations among the five research clusters discussed earlier (that is, work focused on writers, readers, text design, text evaluation, and communication technologies). Although it is necessarily incomplete, I propose the set of questions shown in Figure 3 as a research agenda for document design in the 1990s. The cumulative effect of addressing such questions would put document design on the research map. And before long other disciplines will look to our work for ideas.

Despite the problems related to studying document design, research is flourishing in some U.S. English departments which offer a PhD in rhetoric, as well as in some departments of educational psychology, applied psychology, cognitive psychology, instructional design, information science, engineering, agriculture, and educational technology. Research is also being conducted in industrial research labs and in non-profit government- or university-sponsored research centers in the U.S., Canada, U.K., and Australia.

I am optimistic that the next ten years will mark a turning point in document design research internationally. It seems likely that more educational institutions around the world will recognize that a comprehensive theory of discourse must account for texts outside of the academy. This awareness should lead to a more supportive and less isolated intellectual environment for document design researchers in universities. It also seems likely that government and industry around the world will become more concerned with understanding the communication practices of other cultures. Such an interest will bring into focus the need for more research in document design and that recognition may lead government and industry to develop collaborative efforts to fund research on those problems that unite us.

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